

REMARKS

Claims 1-20 are pending. Claims 8-10 and 18 are withdrawn from consideration. Claims 21-22 were previously cancelled.

Reconsideration and review of the claims on the merits are respectfully requested.

Information Disclosure Statement

The Examiner restates his previous objection, further noting that JP-A-2000-58451, as cited in the specification, is not listed on any Information Disclosure Statements which have been filed.

Applicant responds as follows.

Applicant believes that the Examiner has removed the objection to the IDS filed June 14, 2002, listing Application No. 09/691,057. However, Applicant still requests the Examiner to confirm, in the next Office Action, that the co-pending application has been considered pursuant to MPEP §609 III. C(2). The co-pending application was not listed on Form PTO-1449 so as not to be printed on the face of the issued patent. MPEP §609 III.D.

Furthermore, as to JP-A-2000-58451, Applicant submits concurrently herewith a copy of the reference and an English language Abstract thereof, including modified PTO/SB/08 A & B substitute for Form 1449.

Accordingly, Applicant respectfully requests withdrawal of the objection to the IDS.

Claim Rejections - 35 U.S.C. § 112

With regard to claims 1-10 and 19-20, the Examiner questions support for "said second conduction-type surface ohmic electrode... does not exist below said pad electrode." With regard

to claims 11 - 18, the Examiner questions support for "said surface ohmic electrode... does not exist below said pad electrodes."

Applicant responds as follows.

Claims 1, 11 and 19 have been amended for clarification to recite that "said second conduction-type surface ohmic electrode is composed of a plurality of electrodes which are disposed on the surface of the region other than the projective region of the pad electrode on said group-III nitride crystal layer, and said window layer covers and is in contact with the surface of said group-III nitride crystal layer on the entire projective region of the pad electrode". Support may be found, for example, at page 13, line 33 to page 14, line 3 of the present specification and as illustrated in Figs. 3, 4, 7 and 9. For example, in reference to Fig. 3, window layer 306 covers and is in contact with the surface of group-III nitride crystal layer 305 on the entire projective region 307a of the pad electrode 307.

Accordingly, it is respectfully submitted that the amended claims fully comply with 35 U.S.C. § 112, and withdrawal of the foregoing rejection is requested.

Claim Rejections - 35 USC § 103

Claims 1 - 3 and 6, 7 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Ming-Jiunn et al in view of Ohba et al and Okazaki et al for the reasons given in the Office Action.

Claims 4 and 5 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Ming-Jiunn, Ohba and Okazaki as applied to claim 1 above, and further in view of Bastek for the reasons given in the Office Action.

Claims 11 - 13, 16, 17, 19, and 20 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Ming-Jiunn in view of Okazaki for the reasons given in the Office Action.

Claims 14 and 15 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Ming-Jiunn and Okazaki as applied to claim 11 above, and further in view of Bastek for the reasons given in the Office Action.

Applicant responds as follows.

Concerning the rejected claims, Applicant agrees with the Examiner as to the following points (a)-(e):

(a) Ming-Jiunn discloses in Figure 7 a group-III nitride semiconductor light-emitting diode comprising at least a first conduction-type single crystal substrate (52) provided with a first conduction-type back surface ohmic electrode (19) on a back surface thereof, a buffer layer (16) on a front surface of the single crystal substrate, a gallium nitride (GaN)-based group-III nitride crystal layer (13/14) having a light-emitting part of hetero-junction structure on the buffer layer, and a window layer (11b) comprising an electrically conducting transparent oxide crystal layer on the group-III nitride crystal layer, wherein at least a second conduction-type surface ohmic electrode (42) conductive with the window layer is between the surface of the group-III nitride crystal layer and the window layer, the second conductor-type surface ohmic electrode (42) comes into contact with the surface of the group-III nitride crystal layer (not the window layer), and a whole pad electrode for wire bonding is on the center of the upper surface of the window layer.

(b) Ming-Jiunn does not teach that the buffer layer comprises a boron phosphide (BP)-based material.

(c) Ohba teaches in Figure 13 a buffer layer (62) comprising a boron phosphide (BP)-based material on a front surface of a single crystal substrate (61).

(d) Ming-Jiunn and Ohba do not teach that the second conduction-type surface ohmic electrode is composed of a plurality of electrodes.

(e) Okazaki teaches in Figures 1 and 4 a second conduction-type surface ohmic electrode (13) conductive with a window layer (15) disposed between a surface of a group-III nitride crystal layer (7) and the window layer and coming into contact with the surface of the group-III nitride crystal layer. Also, the second conduction-type surface ohmic electrode is composed of a plurality of electrodes and does not exist below the pad electrode.

Applicant respectfully disagrees with the Examiner as to the following two points (f) and (g):

(f) Okazaki teaches in Figures 1 and 4 a pad electrode (17) for wire bonding disposed on the center of the upper surface of the window layer.

(g) Okazaki teaches in Figures 1 and 4 a window layer covering the surface of the group III nitride crystal layer below the pad electrode.

With respect to (f), Okazaki teaches a pad electrode (49) for wire bonding disposed on center in Figures 5 or 6, but not in Figures 1 and 4. Figures 5 and 6 of Okazaki certainly do not show a plurality of second conduction-type surface element electrodes as required by the present claims.

With respect to (g), to the contrary, Okazaki does not teach that the window layer covers the surface of the group III nitride crystal layer below the pad electrode. Namely, the present invention differs from Okazaki in that in the invention the window layer covers the surface of the group-III nitride crystal layer directly under the pad electrode. In Okazaki there is no window layer, but rather a dielectric layer 11, covering the surface of the group-III nitride crystal layer directly below the pad electrode.

As such, and specifically with respect to (g) above, there is no combination of the cited references which would achieve the invention. Namely, none of Ming-Jiunn, Ohba, Okazaki or Bastek disclose a window layer in contact with and covering the surface of the group-III nitride crystal layer over the entire projective region of the pad electrode. In Figure 7 of Ming-Jiunn, window layer 11B is disposed below p-type electrode 10, but does not contact a group-III nitride crystal layer below the pad electrode. Rather, window layer 11B contacts p-type electrode 42. Such structure is also not disclosed by Ohba or Bastek either. In Okazaki, Fig. 1(a) shows window layer 15 above the surface element electrode (13), but window layer (15) is not disposed directly below the entire anode (17) and is not in contact with the surface of a group-III nitride crystal layer (7) directly below the entire anode (17).

To clarify the above-noted differences between the invention and the prior art, claims 1, 11 and 19 have been amended to recite that the window layer covers and is in contact with the surface of the group-III nitride crystal layer on the entire projective region of the pad electrodes. This is clearly shown, for example, in Fig. 3 of the specification where window layer 306 covers

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and is in contact with the surface of the group-III nitride crystal layer 305 on the entire projective region 307a of the pad electrode 307.

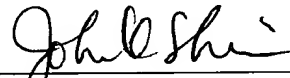
Withdrawal of all rejections and allowance of claims 1-20 is earnestly solicited.

Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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23373

CUSTOMER NUMBER

Date: September 17, 2003



Fig. 1

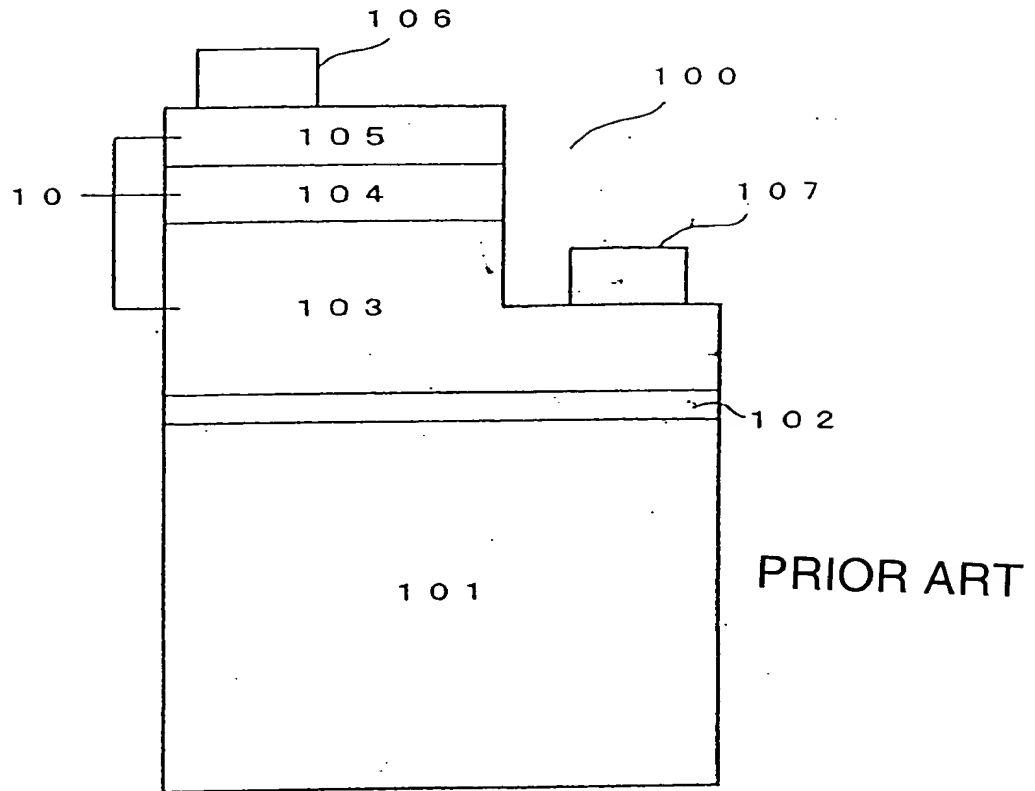


Fig. 2

